

## **REMARKS/ARGUMENTS**

Applicant would like to thank the Examiner for taking the time to discuss the subject case with applicant's attorney the afternoon of October 5, 2004. In summary, the interview consisted of the Examiner answering applicant's questions regarding some of the rejections included in the Office action of July 7, 2004.

Claims 1 to 51 have been canceled without prejudice. New claims 51 to 82 have been added to more clearly present the invention and differences between the new claims and canceled claims should not be viewed as acquiescence to any of the Examiner's rejections. No new matter is believed to be introduced by the present amendment and, therefore, entry and consideration of same is believed proper and respectfully requested.

The Examiner rejects the pending claims under 35 USC 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner states that support for features of the invention included in the pending claims should be specifically pointed out, either in the specification or in the originally filed claims.

Applicant traverses the rejection and submits the following:

The meaning of "a microinjection assembly comprising an optical microscope and a microinjection system comprising a micropipette" (claim 51) is disclosed, for example, in (a) of originally filed claim 8.

The meaning of "viewing the micropipette from an angle oblique to the surface of the embryo" (claim 51) is disclosed, for example, at page 23, line 6.

The meaning of "injecting nucleic acid into the avian embryo by the micropipette" (claim 51) is disclosed for example, at page 19, line 18 to 20.

The meaning of "allowing the avian embryo to develop into a chick" (claim 51) is included in originally filed claim 9.

Claim 52 includes the feature of "a light microscope". It can be seen, for example, in Figure 1 that the microscope can be a light microscope. It is also stated at page 7, lines 5, that "The microscope may use transmitted light..."

The meaning of Claim 53 is disclosed, for example, in (d) of originally filed claim 8 and is apparent based on Figure 1.

The meaning of "wherein an oscillation is applied to the micropipette" (claim 54) is included in (e) of originally filed claim 8.

The meaning of "wherein the oscillator is a piezo-electric oscillator" (claim 55) is disclosed in the specification, for example, at page 22, line 9.

The meaning of “wherein the nucleic acid is a vector” (claim 56) and wherein the vector is a non-viral vector (claim 57) are disclosed in the specification, for example, at page 27, line 12.

The meaning of “wherein the nucleic acid is a plasmid” (claim 58) is supported, for example, in originally filed claim 10.

The meaning of “wherein the avian embryo is an embryo of a chicken (claim 59) is disclosed, for example, in originally filed claim 14.

The meaning of “comprising delivering the embryo to a recipient avian female” (claim 60) is disclosed, for example, in originally filed claim 19.

The meaning of “wherein the delivering is to an infundibulum of the recipient avian female” (claim 61) is disclosed, for example, in originally filed claim 17 (second claim 17 of two).

The meaning of “wherein delivering nucleic acid to the avian embryo through the pipette comprises inserting the micropipette into the germinal disc” (claim 62) and “wherein inserting the micropipette into the germinal disc comprises penetrating a vitelline membrane” (claim 63) is disclosed, for example, on page 8, lines 6 to 12.

The meaning of “wherein the nucleic acid is delivered to a recipient cell in the avian embryo” (claim 64) is disclosed, for example, in (f) of originally filed claim 8.

“viewing the micropipette from an angle less than 90 degrees from perpendicular to the embryo” (claim 65) is inherent in the specification based on an accepted definition for “oblique” found in Webster’s dictionary.

“viewing the micropipette from the side” (claim 74) is supported in Figures 1, 2a, 2b and 2c, where it can be seen that the microinjection assembly provides for side viewing of the micropipette during injection.

Similar to claims 52 to 64, support for dependent claims 66 to 73 and 75 to 82 can be found in the specification or in the claims as originally filed.

The Examiner rejects the pending claims under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make or use the invention. Specifically, the Examiner rejects the claims as being directed to making cloned avians.

Applicant traverses this rejection. However, applicant has amended the claims such that the claims are directed to making transgenic avians and not cloned avians. For example, claim 48 which was directed to an isolated cell nucleus or an isolated spermatozoon comprising the nucleic acid has been canceled. In addition, claims have been added which are directed to the injection of a vector, for example, a plasmid in order

to produce a transgenic avian. Since applicant is required to provide enablement for only one use set forth in the application, in this case, producing transgenic avians, applicant submits that the enablement rejection should be withdrawn.

The Examiner also rejects the claims stating that the only enabled purpose for the methods is to obtain a germline chimeric chick that carries the exogenous nucleic acid in its germ cells and passes the nucleic acid to its offspring.

Applicant traverses the rejection. However, applicant submits that germline chimeric avians have been produced by microinjection. For example, Love et al (of record, see information disclosure statement accompanying the response to the Office action of October 16, 2003, filed April 8, 2004) has shown production of transgenic avians by microinjection which include the injected transgene in their sperm. Love et al may not report the production of transgenic chicks from the G0 transgenic avians. However, applicant has successfully identified transgenic G1 birds produced by germ line chimeric avians of the invention by screening a large number of chicks. Specifically, over 7000 G1 offspring of the transgenic avians were screened from which eleven G1 transgenic chicks (9 female, 2 male) were identified. It is believed that the low frequency of transgenic offspring may be the result of a low percentage of sperm carrying the transgene in the G0 roosters.

The Examiner states that the specification describes methods of transferring exogenous nucleic acids into chickens but does not teach transferring exogenous nucleic acid into other types of bird embryos.

Applicant traverses the rejection. The present invention provides for an improved method of injecting nucleic acid into an avian germinal disc or embryo. The methods are improved over other such methods, such as the microinjection method described in Love et al. The present methods allow for the angled viewing of the micropipette relative to the germinal disc or embryo. This is a particularly useful feature when microinjecting into an avian egg because, as stated in the specification at page 5, lines 16 to 2: "the optically opaque yolk underlying the oocyte or germinal disk, present unique limitations to microinjection that are not encountered when microinjecting with other, less optically dense cells such as mammalian ova." All avian eggs have the feature of an optically opaque yolk underlying the oocyte or germinal disk. In addition, it is expected that the general concerns, and the techniques required, for producing transgenic chickens are generally applicable for other avians. Therefore, the specification, and what was known in the art at the time of filing the present application, provide a practitioner of ordinary skill in the art with sufficient guidance to produce transgenic avians other than transgenic chickens.

The Examiner rejects claims 43 to 46 and 48 indicating that these claims relate to cloning avians. Applicant traverses the rejection. However, claim 48 has been canceled to facilitate prosecution of the application. The subject matter of claims 43 to 46 relates to the employment of an oscillator. An oscillator, for example, to produce micropipette oscillations, is useful to inject nucleic acid into an embryo of an avian in accordance with

the present invention as claimed. Therefore, applicant requests that the rejection be withdrawn.

The Examiner states that it is unclear how the invention is better than that of the injection system of Love et al. Applicant submits that Figure 2a, 2b and 2c make clear how viewing of the embryo and the micropipette from an angle, opposed to directly overhead of the micropipette, as is the case with other microinjection systems such as that used by Love et al, provides for a facilitated injection of the embryo.

The Examiner rejects the pending claims under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant traverses this rejection. However, applicant submits new claims which applicant believes are not in conflict with the Examiner's statements under 35 USC 112, second paragraph.

The Examiner rejects claims 21, 36 to 42 and 47 to 50 under 35 USC 103(a) as being obvious over Tanaka in view of Sang.

Applicant traverses the rejection. Applicant submits that neither Tanaka nor Sang include the feature of viewing the injection of an avian embryo from an oblique angle. In Sang, a standard microinjection assembly is employed in which the operator of the system views the injection micropipette from a vantage point above the pipette. This makes visualization of the position of the micropipette relative to the avian embryo very difficult. The present invention provides for an enhanced visualization of the position of the micropipette relative to the embryo by employing a viewing angle which is not disclosed in Tanaka or Sang. Therefore, applicant submits that the obviousness rejection is improper and should be withdrawn.

The Examiner rejects claim 36 under 37 CFR 1.75, stating that the claim is substantially a duplicate of claim 21. Applicant traverses the rejection. However, claim 36 has been canceled thereby obviating the rejection.

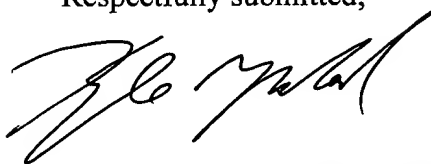
In conclusion, applicant has shown that the present claims meet the requirements for patentability under the 35 USC 112, first and second paragraphs and under 35 USC 103. Therefore, applicant submits that the presently pending claims are allowable and respectfully requests the Examiner to pass the above-identified application to allowance.

If any issues remain unresolved, or if the Examiner has any questions, it is

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Amdt. Dated October 13, 2004  
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requested that the Examiner call applicant's attorney at the below referenced telephone number.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Kyle Yesland', written in a cursive style.

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